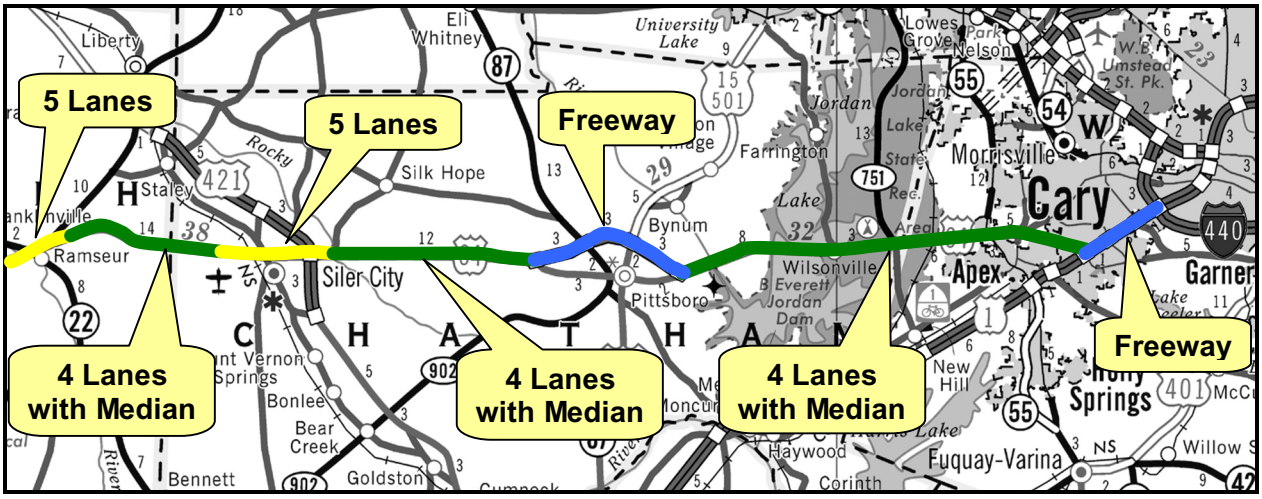
Chapter 2 - Concept Development

2.1 Why was the Concept Initiated?

The SHC concept stems from the practice of long-range systems planning. Since the 1960s, systems planning studies have been conducted in local and regional areas throughout North Carolina. These studies have been valuable, and have helped communities understand growth and better plan for transportation improvements. However, study recommendations typically stop at planning area borders, which are usually just beyond city limits or at county boundaries. In addition, decisions made in the project development and planning process typically focused on the limits of the project itself. NCDOT has lacked a broader, statewide vision for how to ensure continuity and consistency for travel flow between these planning areas, communities, and in the development of projects, as illustrated in Exhibit 8. The SHC concept represents the first step towards "connecting the dots" and promoting a more consistent transportation service for motorists in North Carolina.

Exhibit 8: Variations in Roadway Cross-Sections along US 64 in Central North Carolina



The development of this concept began in 2002 and has continued to evolve over time. From the beginning, the concept was shaped by sound technical criteria, planning and operational considerations, significance of historical studies, and the establishment of relevant goals and future applications. Work centered on the need for NCDOT and its stakeholders to consider planning from a broader perspective, with a specific focus on maximizing the mobility of "core" highway facilities within North Carolina's transportation system.

2.2 What are the Themes of the Concept?

The development of the SHC concept was a collaborative effort by the Department of Transportation, Department of Commerce, and Department of Environment and Natural Resources. These agencies saw the need and importance of this initiative to enhance the overall quality of life and business climate in

North Carolina. This concerted effort led to the formation of three key themes that characterize the SHC concept: Mobility and Connectivity, Environmental Stewardship, and Economic Prosperity.

Mobility and Connectivity

Mobility is defined as the ability to move unimpeded, safely, and efficiently using a reliable transportation system, while Connectivity is defined as the ability to travel to desired destinations. The SHC concept will enhance motorists' ability to travel to statewide and regional destinations in a safe and efficient manner.

Economic Prosperity

Expanding upon the Mobility and Connectivity theme, Economic Prosperity is defined as the ability to move people and goods in a manner that creates a more competitive business climate and provides a good quality of life for those employed. An efficient and reliable highway system is vital for North Carolina to stay competitive its ability to attract new business and industry while retaining the companies that currently call the state "home". Improved mobility translates into time-savings for business and freight carriers and accentuates the state's attractiveness for new industry recruitment.

Environmental Stewardship

Coinciding with NCDOT's Environmental Stewardship policy, this theme is defined as striving to preserve and enhance our natural and cultural resources by maximizing the use of the existing transportation infrastructure with the support of compatible land uses. The intent of the SHC concept is to make the most out of the state's existing infrastructure and limit (to the extent possible) construction on new location. By building upon an existing "footprint," impacts due to construction to the surrounding natural, cultural, and social environment can be reduced. This may not be feasible in all cases, however, the concept does lay the groundwork to support a long-term shift in how highway improvements can be made. Additionally, consistent and compatible land uses will be needed to support this effort.

2.3 What are the Purpose and Goals of the Concept?

The primary purpose of the SHC Concept is to provide a safe, reliable, and high-speed network of highways that connect to travel destinations throughout and just outside North Carolina. There are several goals associated with the concept, which support this purpose and incorporate the three themes mentioned above. The foremost goal is the recognition of new long-term, ultimate facility type designations for each highway corridor (see Chapter 3). This facility type, or vision for how travel along a facility should operate, is a recommendation to move planning beyond jurisdictional boundaries, improve decision-making between NCDOT and its stakeholders, and genuinely build a consensus-based dialogue with citizens who live along these corridors. The envisioned facility type provides motorists a high-speed, safe, and efficient facility for travel. A related goal is to use the concept as a tool to influence and affect ongoing planning and project related decisions in order to realize the facility type vision. Influence can extend to

making project and/or design changes or possible reconsideration of project scope. One example of a small-scale project change would be the early acquisition of right-of-way needed to support larger-scale interchanges for a Freeway, even if an Expressway facility was the project under construction. In other cases, through the preparation of corridor studies, the SHC concept can act as additional input in the development of a planning document to support a particular alternative. Major corridor level studies will provide technical data, environmental information, and local input that should lead to an improved and potentially streamlined, decision-making process. It should be noted however that the SHC concept, the facility types, and any future studies, which support these facility types, do not supersede or negate current federal and state planning requirements. Implementing conclusions or suggested improvements from corridor studies must still follow the laws of the NEPA process.

The SHC concept is expected to influence the decisions described below:

- **Funding Decisions.** Providing a consistent high-level of mobility along corridors requires additional capital costs for the additional infrastructure (e.g., additional right-of-way and bridges). Additional funds and/or establishing new funding sources will be needed to develop master plans for these corridors and to finance improvements necessary to achieve the high-level of mobility.

- **Project Planning Decisions.** During project development process, decisions need to be made that examine how individual project improvements fit within a larger corridor, particularly in regards to the function and connectivity of the entire facility. Establishing the role of a corridor will provide a stronger purpose and need for projects along the facility.

- **Design Decisions.** Appropriate design elements will be needed to support roadway attributes, consistent with envisioned facility type, while also preserving the natural and human environment.

- **Access and Operational Decisions.** Managing access to corridors is crucial for achieving the envisioned facility type and maintaining a high-level of mobility and safety; therefore it requires consistent and careful decisions on driveway connections and traffic signal installations.

- **Local Land Use Decisions.** Achieving and maintaining the desired facility type requires consistent, compatible, and coordinated land use decisions through partnering with local governments.

2.4 How were the Corridors Selected?

The SHC concept represents a new approach to long-range transportation planning in North Carolina. The highway system is viewed from a broader perspective independent of municipal and traditional boundaries, with a greater emphasis on connectivity, goods movement, destination, and the functionality of a facility. As with any new planning initiative, the process started with building a consistent set of definitions, terms, and selection criteria, which included coordination within NCDOT, and with federal and state agencies. Quantifiable and subjective criteria were developed and applied to distinguish the nature of a "strategic" corridor within the current highway system. Quantifiable criteria included current and future traffic volumes, route classification, and truck traffic percentages. Subjective criteria included

a corridor's role and function, its significance to a regional area, and/or its historical role in national and/or statewide movement.

The selection criterion was established early in the developmental phase of this concept. NCDOT used a data-driven approach and supplemented the analysis with historical information and input from other agencies and the public. Initially the criteria centered on identifying facilities below the Interstate System that exemplified the potential to serve vehicular travel in a high-speed manner. This emphasis on mobility was enhanced by also considering connectivity in the system. The term "Activity Center" was introduced to define destinations, encompassing statewide, regional, and places just outside of North Carolina's borders that serve the state's citizens. The original approach utilized criteria to distinguish and organize corridors and activity centers into a two-tier structure, comprising statewide and regional tiers. However, over time and with public input, each selected corridor was simply referred to as "strategic", without regard to size or scale.

The selection of the corridors is characterized by one or more of the following primary criteria:

- **Mobility.** This criterion focuses on whether a corridor currently serves or has the potential to expeditiously move large volumes of traffic. These include facilities that are vital to the state's and/or region's interest and serves long-distance and/or regional travel, whose users may be long haul trucks, tourists, and/or motorists passing through a region.

- **Connectivity.** This criterion focuses on whether a corridor provides a vital connection between Activity Centers (see Section 2.5 for a further explanation)

- **Interstate Connectivity.** This criterion focuses on whether a corridor provides an important connection between existing and/or planned interstates. Interstates, as routes of national significance, primarily move people, goods, and military units between states and across the country.

- **Interstate Reliever.** This criterion focuses on whether a corridor currently serves or has the potential to serve as a reliever route to an existing interstate facility. A reliever route is considered to be an alternate facility (typically running parallel to the facility for a long-distance) to the interstate(s). Facilities that relieve interstates for short distances or are used as alternates in the event of an incident or construction are not considered Interstate relievers.

Additional elements were also taken into consideration to support the corridor selection process. These include the following:

- **Hurricane Evacuation Route.** This criterion focuses on whether a corridor is considered a major route from the NC Emergency Management's Coastal Evacuation Route Map.

- **Cited in a Prominent Report.** Certain reports list the need for improvements along major corridors in the state, mainly to improve economic conditions in a particular area. One such report is the Rural Prosperity Task Force Report, completed in 2000, which supports improvements for three prominent corridors in rural North Carolina.

- **Part of a Major Highway System.** This criterion focuses on whether a corridor is part of a national, statewide, economic, or military highway system. Major highway systems include the Dwight D. Eisenhower National System of Interstate and Defense Highways, the National Highway System (Exhibit 9), the North Carolina Intrastate System (Exhibit 10), the Appalachian Development Highway System (Exhibit 11), and STRAHNET. STRAHNET is the Department of Defense's Strategic Highway Network for moving military personnel and equipment.

Exhibit 9: National Highway System in North Carolina

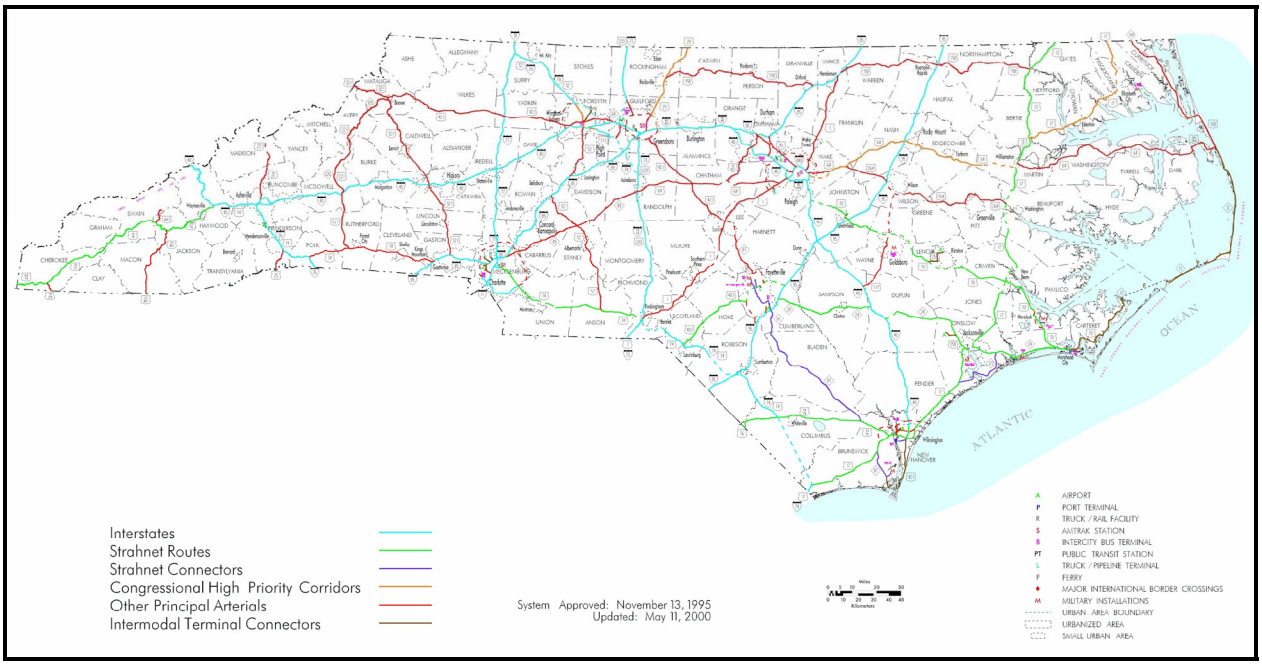


Exhibit 10: North Carolina Intrastate System

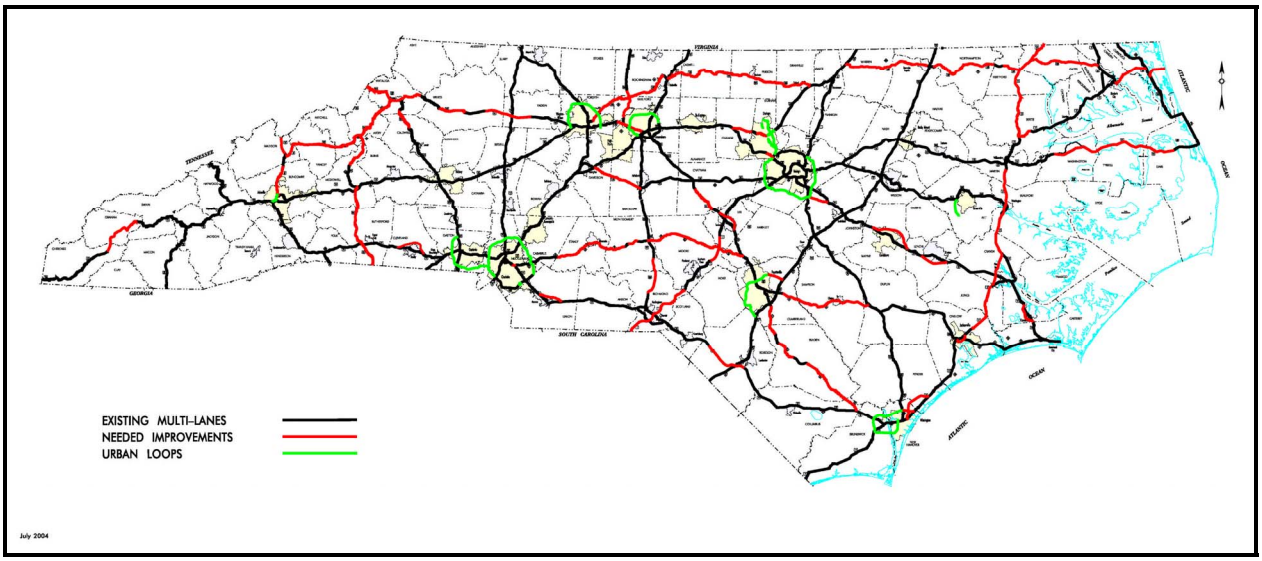
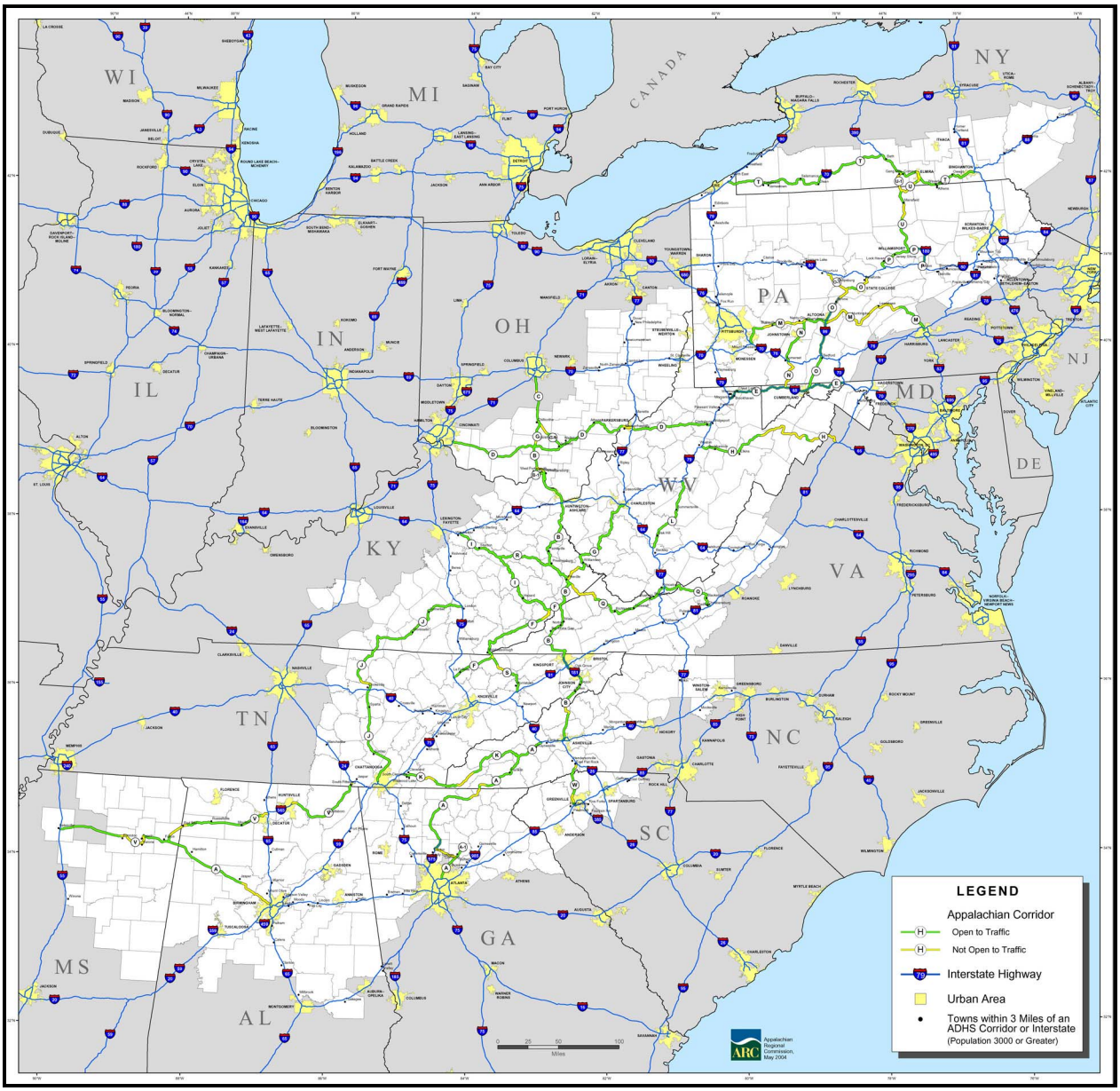


Exhibit 11: Appalachian Development Highway System



Source: Appalachian Regional Commission

2.5 What are Activity Centers?

Activity Centers represent the hubs or destinations connected by one or more Strategic Highway Corridors. These centers are the starting and/or ending point for the movement of people and goods. For the purposes of this concept, they are defined as the following:

- Urban Areas with a Population of 20,000 or greater
- State Seaports
- Major Airports
- Major Intermodal Terminals
- Major Military Bases
- University of North Carolina System Campuses
- Trauma Centers
- Major Tourist Attractions

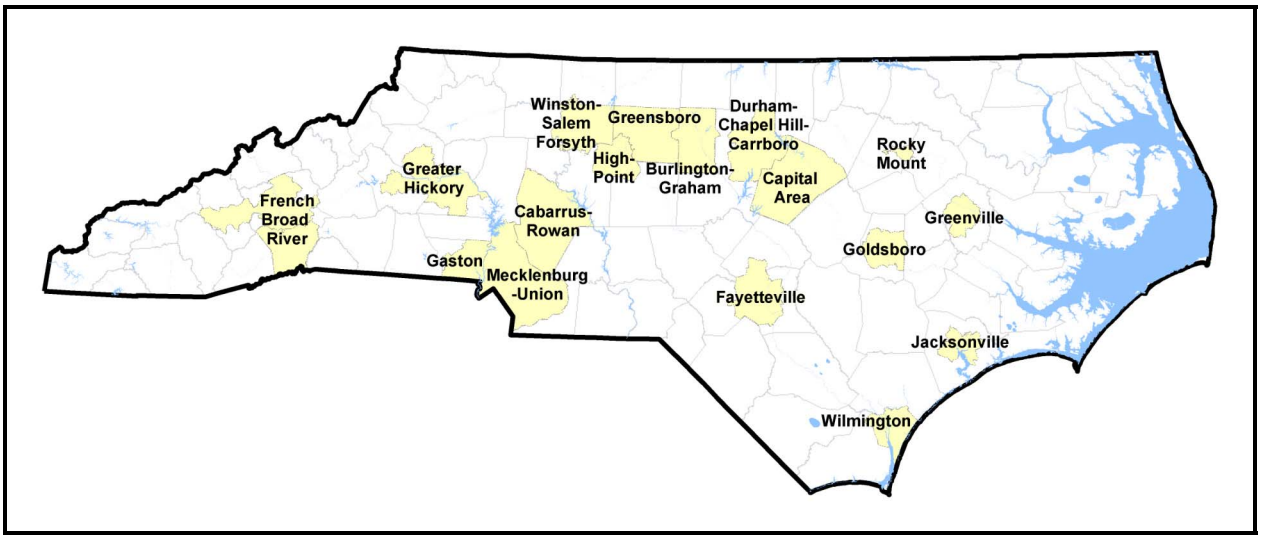
Urban Areas

Urban Areas with a population of at least 20,000 persons are considered to be an activity center. This definition includes all the Metropolitan Planning Organizations (MPOs), which have a population of 50,000 or greater (based on the 2000 Census), along with other regional urban areas in which major activities, such as shopping or manufacturing, take place. These urban areas typically are a hub of commercial, retail, or industrial activity for the area. The 17 MPOs in North Carolina are:

- French Broad River MPO (Asheville-Hendersonville-Waynesville)
- Greater Hickory MPO (Hickory-Newton-Conover)
- Gaston Urban Area MPO
- Mecklenburg-Union MPO (Charlotte-Monroe)
- Cabarrus-Rowan MPO (Concord-Kannapolis-Salisbury)
- Winston-Salem Urban Area MPO
- Greensboro Urban Area MPO
- High Point Urban Area MPO
- Burlington-Graham MPO
- Durham-Chapel Hill-Carrboro MPO
- Capital Area MPO (Raleigh-Cary)
- Fayetteville Area MPO
- Goldsboro Urban Area MPO
- Wilmington MPO
- Rocky Mount Urban Area MPO
- Greenville Urban Area MPO
- Jacksonville Urban Area MPO

Exhibit 12 illustrates the location of the 17 MPOs.

Exhibit 12: Metropolitan Planning Organizations in North Carolina



Major urban areas just outside North Carolina's borders are also considered activity centers as many North Carolina residents are destined to these areas for their daily activities. These areas include the Hampton Roads area in Virginia (Norfolk-Virginia Beach), Danville, VA, Atlanta, GA, and Myrtle Beach, SC.

State Seaports

There are two state seaports in North Carolina, located in Wilmington and Morehead City (see Exhibit 14). These two ports play a crucial role in the state's economy as they help foster the movement of goods across North Carolina and the southeastern United States. These ports are also becoming extremely important as the nearby ports in Charleston, SC and Norfolk, VA approach their capacity. Providing modern, efficient transportation infrastructure to the state's ports will be vital to their long-term economic success. The port in Wilmington currently has better access to an Interstate facility, as the eastern terminus for I-40 is in the vicinity. The Army Corps of Engineers has also completed a major dredging project in the Cape Fear River, which allows larger ships to enter the Wilmington area. In state fiscal year 2004 (July 2003 to July 2004), 328 ships and 48 barges docked in Wilmington, exchanging 2,326,765 tons of goods (container, breakbulk, and bulk). During the same time period, 168 ships and 250 barges docked in Morehead City exchanging 2,215,591 of goods (breakbulk and bulk).

Major Airports

There are six major commercial airports in the state, which facilitate the movement of people and goods throughout North Carolina and the United States (see Exhibit 14). They are:

- Asheville Regional (AVL)
- Charlotte-Douglas International (CLT)
- Fayetteville Regional (FAY)
- Piedmont-Triad International (GSO) located in Greensboro
- Raleigh-Durham International (RDU)
- Wilmington International Airport (ILM)

CLT is the largest commercial airport in the state, in terms of both cargo moved and passenger boardings or enplanements. CLT is considered to be a large hub according to the Federal Aviation Administration[8] (FAA), as more than 1% of the national passenger boardings occur there. CLT is currently served by nine carriers and is home to US Airways largest hub. RDU is considered to be a medium hub according to the FAA with less than 1%, but more than 0.25% of the national passenger boardings. Eleven airlines currently provide service to RDU, including many low-cost carriers. The airport also serves the greatest amount of local traffic (passengers whose origin and/or destination is RDU) in the state (see Exhibit 13).

GSO is considered to be a small hub with less than 0.25%, but more than 0.05% of the national passenger boardings. Seven carriers currently serve GSO. AVL, FAY, and ILM are all classified as Nonhubs as less than 0.05% of the national passenger boardings occur at each of these airports. Five commercial carriers serve AVL, while both FAY and ILM are each currently served by two. Exhibit 13 below lists the total enplanements, percentage of local passengers, and tons of cargo moved (enplaned and deplaned) for 2004.

Exhibit 13: 2004 Passenger and Cargo Data for the Major Commercial Airports

Airport Name	Location Identifier	Hub Type	Passenger Enplanements (National Ranking)	Percent Local Passengers[9]	Cargo Moved (tons)
Charlotte-Douglas International	CLT	Large	12,562,133 (19)	24%	169,173
Raleigh-Durham International	RDU	Medium	4,330,492 (43)	88%	120,616
Piedmont Triad International	GSO	Small	1,355,948 (79)	89%	80,267
Wilmington International	ILM	Nonhub	288,471 (153)	88%	2,059
Asheville Regional	AVL	Nonhub	264,074 (155)	92%	N/A
Fayetteville Regional	FAY	Nonhub	157,006 (187)	92%	N/A

GSO is currently in the process of adding an additional runway to accommodate the FedEx Air Cargo Hub. CLT and RDU also plan to expand the number of runways as additional capacity is needed in the future.

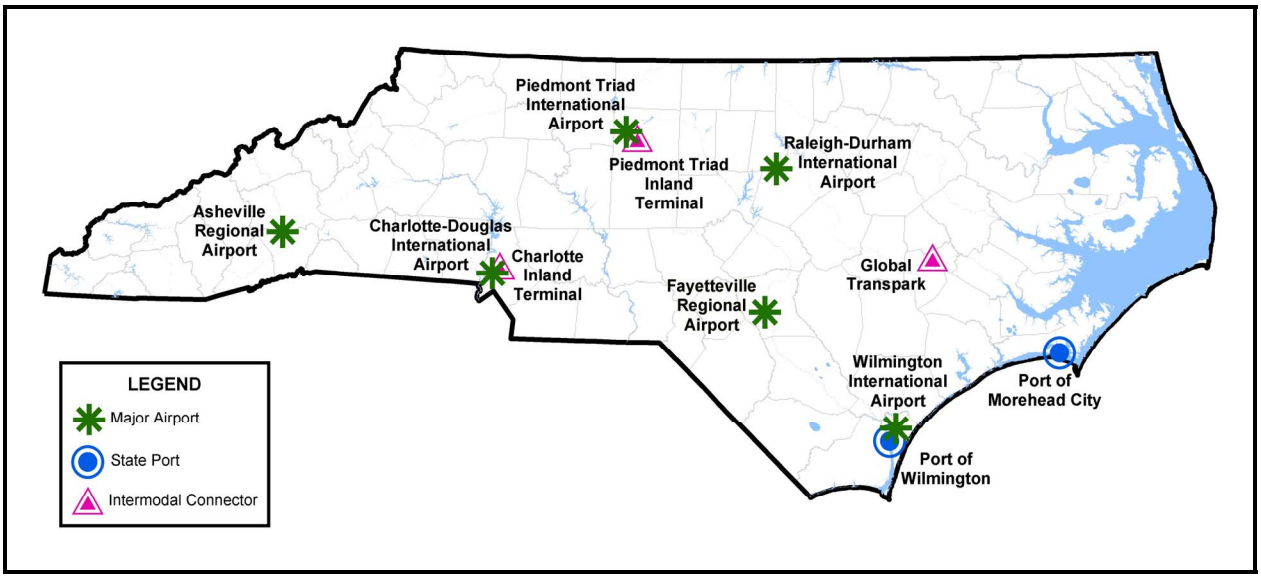
Major Intermodal Terminals

Intermodal Terminals represent a location where the transfer of goods from one mode to another occurs. These locations are sometimes referred to as inland ports or inland terminals due to the high volume of freight transfers. There are two major train-truck transfer stations in the state: Charlotte Inland Terminal (CIT) and Piedmont Triad Inland Terminal (PTIT) located in Greensboro (see Exhibit 14). These terminals are expected to experience substantial increases in cargo transfers over the next few years as a result

[8]Federal Aviation Administration, *Passenger Boardings and All Cargo Data*, http://www.faa.gov/arp/planning/stats/index.cfm.
[9]United States Department of Transportation Origin and Destination Survey; based on a 10% sample of all enplanements.

of increased traffic at the state's seaports. Currently, the majority of air-truck transfers occur at the six major airports in the state. In the future however, the potential exists for this type of transfer to occur additionally at the Global TransPark in Kinston.

Exhibit 14: Major Airports, Seaports, and Inland Terminals in North Carolina



Major Military Installations

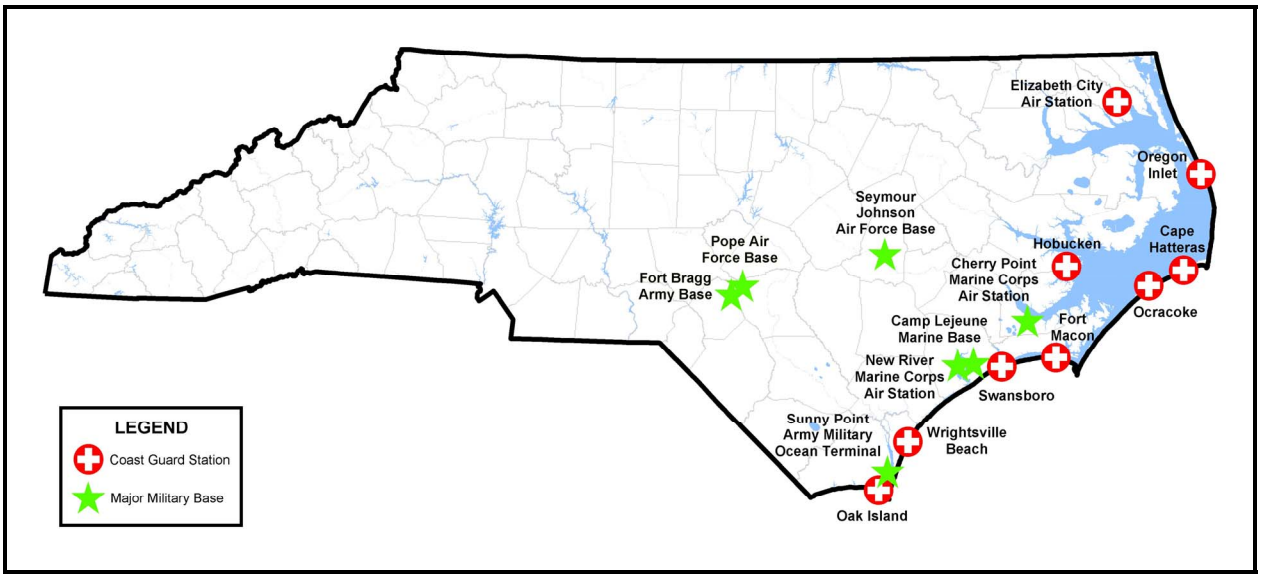
There are seven major military installations in the state, which house various units of the United States Military. The seven major bases are:

- Fort Bragg Army Base (Cumberland and Hoke Counties)
- Pope Air Force Base (Cumberland County)
- Seymour Johnson Air Force Base (Wayne County)
- Sunny Point Army Military Ocean Terminal (Brunswick County)
- New River Marine Corps Air Station (Onslow County)
- Camp Lejeune Marine Base (Onslow County)
- Cherry Point Marine Corps Air Station (Craven County)

In times of war, military installations need to mobilize equipment and personnel quickly and efficiently. Public seaports and airports serve to facilitate this logistical supply chain. Infrastructure improvements to seaports in particular are critical since these facilities are used as embarkation points.

Coast Guard stations also play an important role in protecting North Carolina. While moving equipment via highways is not as vital to these stations, they are increasingly important for the purposes of homeland security. Stations located in North Carolina are part of the 5th Coast Guard District, which includes an air station in Elizabeth City. Smaller boating units are located at Elizabeth City, Emerald Isle, Fort Macon, Hatteras Inlet, Hobucken, Oak Island, Ocracoke, Oregon Inlet, and Wrightsville Beach. Exhibit 15 illustrates the location of both the major military installations and the Coast Guard stations.

Exhibit 15: Major Military Installations in North Carolina



University of North Carolina System Campuses

Sixteen campuses comprise the University of North Carolina System (see Exhibit 16). Each campus is an activity center within itself, as each employs hundreds of people while further housing and educating thousands of students. Exhibit 17 lists the campus locations and 2004 student enrollment, faculty, and staff.

Exhibit 16: University of North Carolina System Campuses

Source: *University of North Carolina*

Exhibit 17: University of North Carolina System Student and Employee Data (Fall 2004)

Institution	Student Enrollment	Faculty	Non-Faculty Employees
Appalachian State University (Boone)	14,653	990	1,458
East Carolina University (Greenville)	22,767	1,736	3,020
Elizabeth City State University	2,470	156	335
Fayetteville State University	5,441	291	528
North Carolina Agricultural and Technical State University (Greensboro)	10,383	596	1,070
North Carolina Central University (Durham)	7,727	465	970
North Carolina School of the Arts (Winston-Salem)	788	136	269
North Carolina State University (Raleigh)	29,957	1,834	5,662
University of North Carolina at Asheville	3,574	322	442
University of North Carolina at Chapel Hill	26,878	3,088	7,922
University of North Carolina at Charlotte	19,846	1,144	1,636
University of North Carolina at Greensboro	15,329	933	1,576
University of North Carolina at Pembroke	5,027	357	412
University of North Carolina at Wilmington	11,574	684	1,078
Western Carolina University (Cullowhee)	8,396	571	874
Winston-Salem State University	4,805	328	384

Source: *University of North Carolina*

The campuses also attract thousands of people not associated with the school for school-sponsored events, such as sporting and cultural events.

Trauma Centers

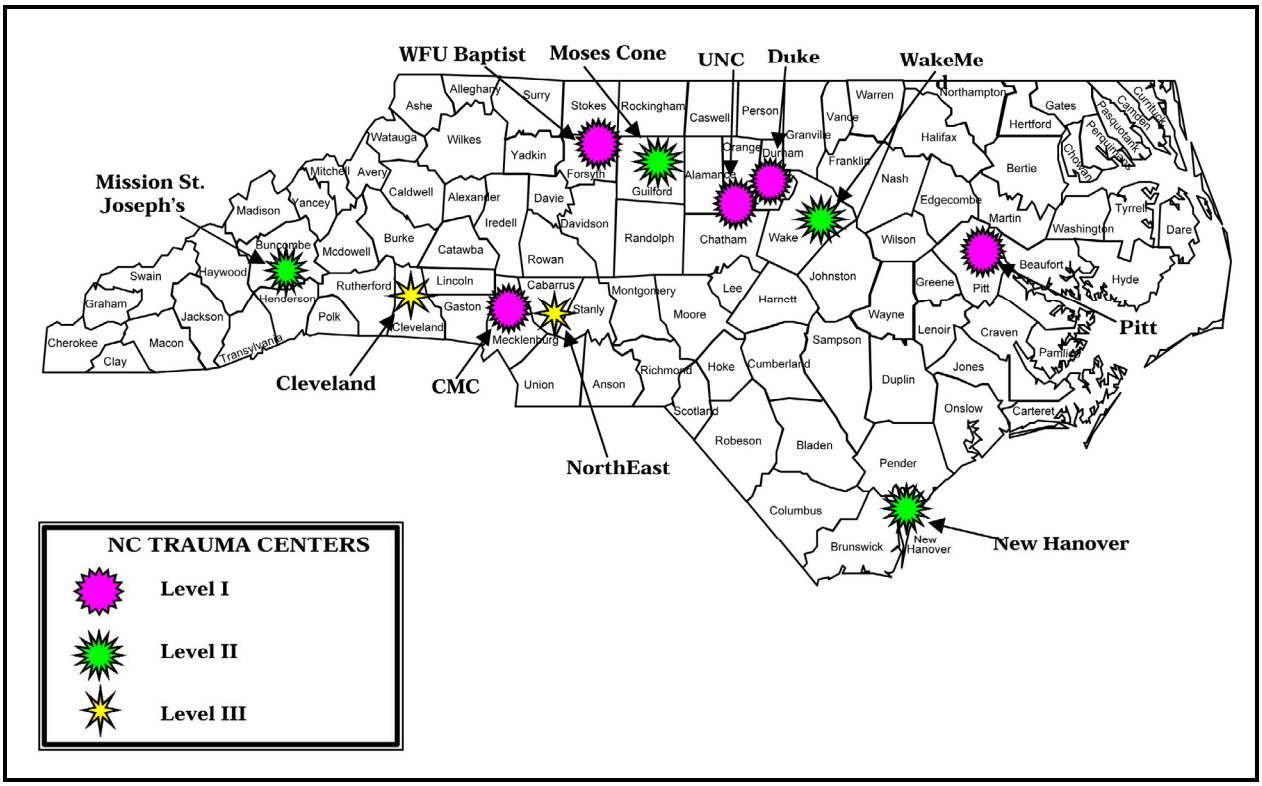
A trauma center is defined as a specialized hospital facility distinguished by the immediate availability of specialized surgeons, physician specialists, anesthesiologists, nurses, and resuscitation and life support equipment on a 24 hour basis to care for severely injured patients or those at risk for severe injury. Trauma Centers employ hundreds of workers across the state while serving hundreds that are in need of medical care. There are only a limited number of centers across the state, usually located at major or regional hospitals. As a result, people seeking services provided by a trauma center often travel significant distances within a region to reach one. Trauma center designation criteria are produced by the North Carolina Office of Emergency Medical Services (NCEMS). Trauma centers in North Carolina include:

- Mission Hospitals (Asheville)
- Cleveland Regional Medical Center (Shelby)
- Carolinas Medical Center (Charlotte)
- Northeast Medical Center (Concord)
- Wake Forest University Baptist Medical Center (Winston-Salem)
- Moses Cone Memorial Hospital (Greensboro)
- University of North Carolina Hospitals (Chapel Hill)
- Duke University Medical Center (Durham)

- WakeMed (Raleigh)
- New Hanover Regional Medical Center (Wilmington)
- Pitt County Memorial Hospital (Greenville)

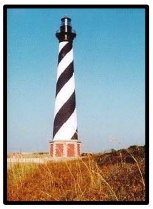
Three different levels of trauma centers reside in the state. Level I facilities have the capability of providing leadership, research, and total care for every aspect of injury from prevention to rehabilitation. Level II facilities provide definitive trauma care regardless of the severity of the injury, but may not be able to provide the same comprehensive care as a Level I trauma center, and does not have trauma research as a primary objective. Level III facilities provide prompt assessment, resuscitation, emergency operations, and stabilization, and arranges for hospital transfer as needed to a Level I or II trauma center. Exhibit 18 below shows the trauma centers in North Carolina with their corresponding service level.

Exhibit 18: Trauma Centers in North Carolina



Source: *North Carolina Office of Emergency Medical Services*

Major Tourist Attractions



Tourism is one of North Carolina's largest industries, as the state has acres of natural beauty and parks, along with many man-made attractions. The top twenty-five attractions in North Carolina, as determined by NCDOC, include the Cape Hatteras National Seashore, the North Carolina Zoological Park, Harrah's Cherokee Casino and Hotel, the Biltmore Estate, the North Carolina Memorial Battleship, Uwharrie National Forest, the Wright Brothers National Memorial, and Concord Mills Mall. Efficient and safe access to these destinations is an important part of North Carolina's economic vitality.

2.6 How was the Public Involved in the Development of this Concept?

From November 2003 to January 2004, NCDOT, NCDOC, and NCDENR co-sponsored a series of public meetings (regional forums) throughout North Carolina to share the SHC concept with stakeholders and gather their reactions in order to share input with management and the Board of Transportation. The major objectives for the public forums were as follows:

- Educate stakeholders about the overall SHC concept
- Gather stakeholders' reactions, input, ideas, and critical issues about SHC concept
- Educate stakeholders about next steps and timeframes in the planning process

Nine public forums were held throughout North Carolina in both urban and rural areas and in the three geographic areas in the state (west, central, east): Bryson City, Wilkesboro, Asheville, Huntersville, Southern Pines, Greensboro, Jacksonville, Wilson, and Williamston. This outreach approach was structured to ensure that both broad statewide and unique regional perspectives would be heard. Each forum lasted approximately two and a half hours and a variety of techniques were used to publicize these forums, including email, brochures, and announcements via newsletters and listserves.

Since the SHC concept represents a new planning direction, NCDOT initially chose to engage those stakeholders who have a vested interest in the conceptual planning aspects (versus those with an interest in project specific details). Targeted stakeholders included local, regional, state, and federal agencies; economic development and environmental organizations; freight industry representatives; political leadership organizations; and other advocacy groups. Approximately 250 people attended the forums, with an average of 25-28 attending each session.

Comments received at the forums covered a broad perspective. Most everyone agreed that the concept was a more organized, efficient, and effective way to plan for the major corridors in the state. Participants felt that the approach promotes a greater sense of connectivity within regions and across the state, while improving safety along these roads, and aiding in economic development. They also felt coordination and communication with local jurisdictions was essential to see success of the effort, specifically in regards to land use planning. Local officials wanted to make sure that the character of their communities and local access are maintained, while having the services of a nearby high-speed facility.

The SHC concept was initially developed using a statewide and regional tier structure as previously mentioned. The size of activity center that connected the corridors, and whether a corridor was more statewide (e.g., US 74) or regional in nature (e.g., NC 73) determined the tier of the facility. Participants at the forums suggested that NCDOT re-examine the structure and expand the definition of an activity center, to include such areas that are home to major hospitals, major tourist destinations, and UNC System Universities. NCDOT responded to these suggestions by designating all the selected corridors as “strategic” and enhancing the activity center definition.

Additional information on the regional forums and comments received can be found in Appendix B.

2.7 What are the Strategic Highway Corridors?

In a nutshell, the Strategic Highway Corridors are a set of predominantly existing highways vital to moving people and goods to destinations within and just outside North Carolina. The selected or designated Strategic Highway Corridors are shown in Exhibit 19. Exhibit 31 in Chapter 3 lists the 55 major or "parent" corridors along with the associated "spurs" (denoted by letters), totaling 5,378 center-line miles, including all existing and proposed interstates. These corridors only account for approximately 7% (6.82%) of the entire state-maintained highway system (78,844 miles), yet they carry approximately 45% (45.4%) of the state's traffic (39,417,784,000 VMT of out 86,873,796,000 VMT statewide). "Spurs" include interstate loops and spurs, business interstates, and other major facilities that connect the parent corridor to the activity center or destination. This includes connections to the central business districts of major cities, airports, military bases, and state ports. The selection of these corridors was coordinated with Virginia, South Carolina, Georgia, and Tennessee to ensure connectivity to the appropriate facilities across North Carolina's borders.

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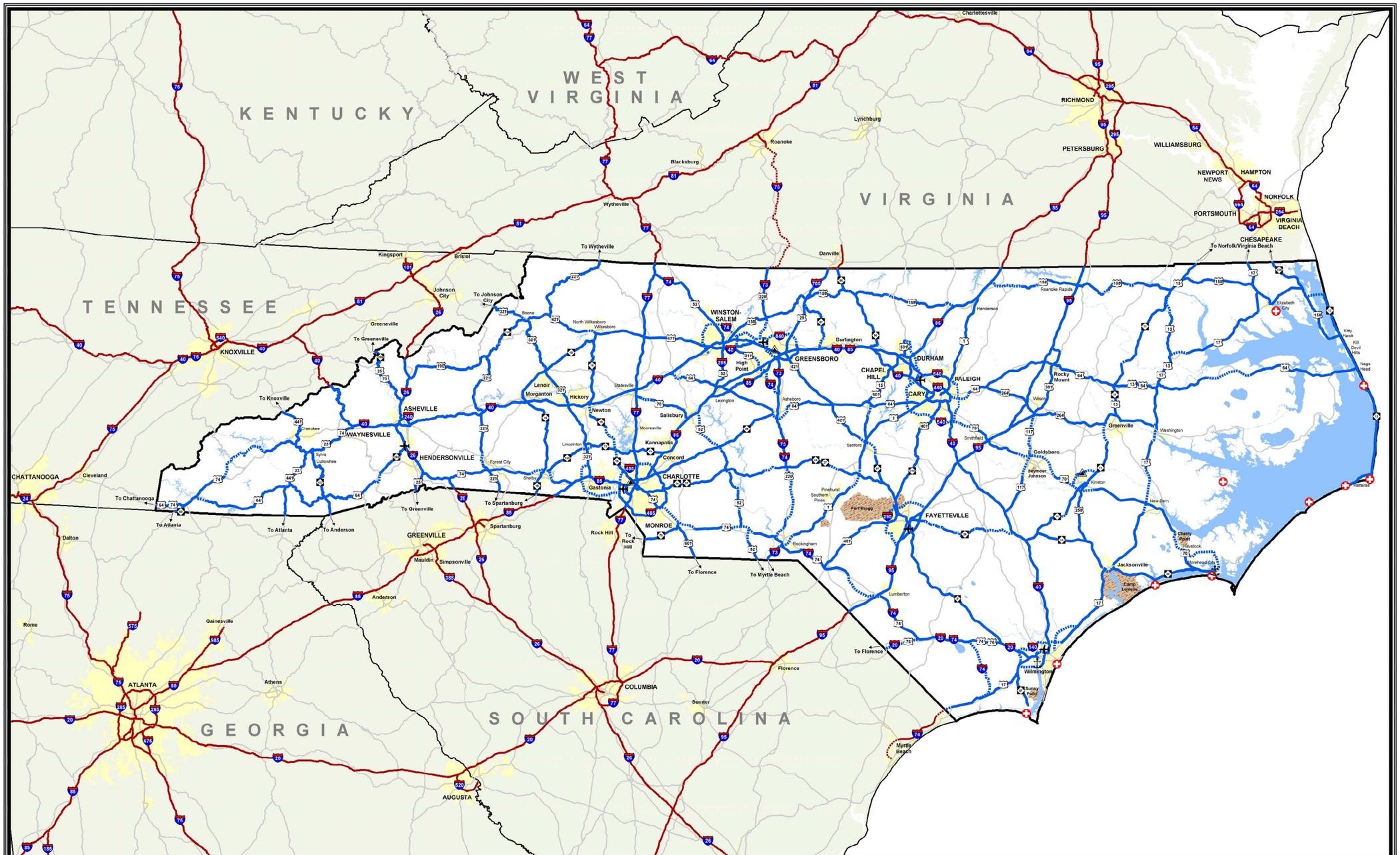

Strategic Highway Corridors
north carolina department of transportation

Exhibit 19: Designated Corridors

Adopted by The North Carolina Board of Transportation

Plan Date: September 2, 2004

N
W E
S

Miles
0 5 10 20 30 40 50

Prepared By:
The North Carolina Department of Transportation
Transportation Planning Branch

Base Map Date: March 29, 2004

Legend

Strategic Highway Corridors
- Existing
- Currently Planned on New Location

- Interstate
- US/Other Route

- State Port
- Major Airport
- Intermodal Connector
- Coast Guard Station
- Major Military Base
- Urban Area
- Water Features